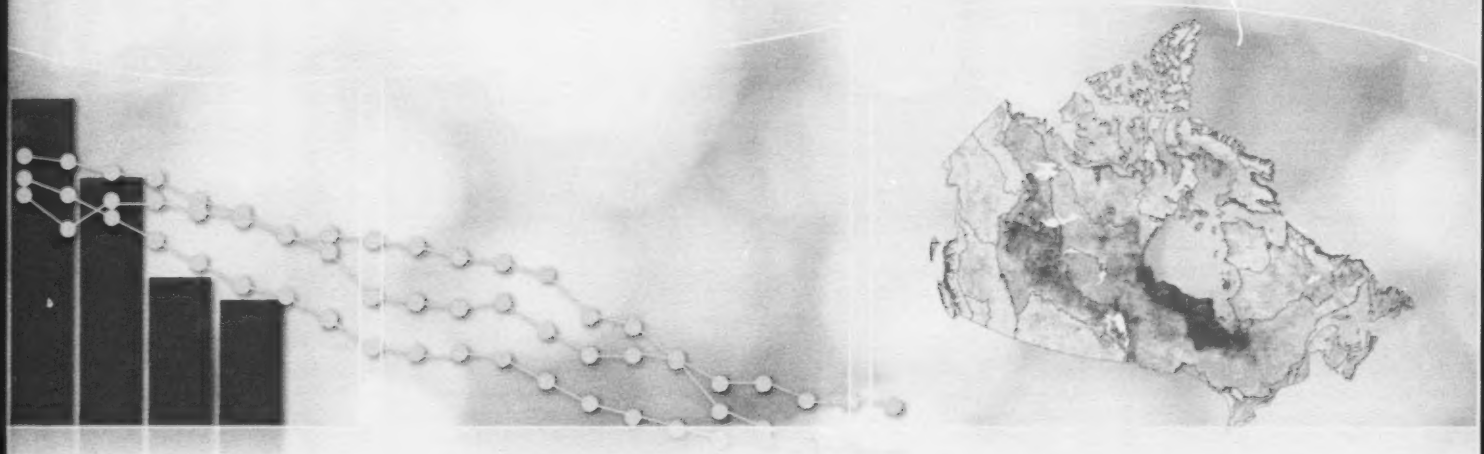
Environment and Climate Change Canada
Environnement et Changement climatique Canada

Canadian Environmental Sustainability Indicators

Releases of harmful substances to water



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Canadian Environmental Sustainability Indicators

Releases of harmful substances to water

August 2018

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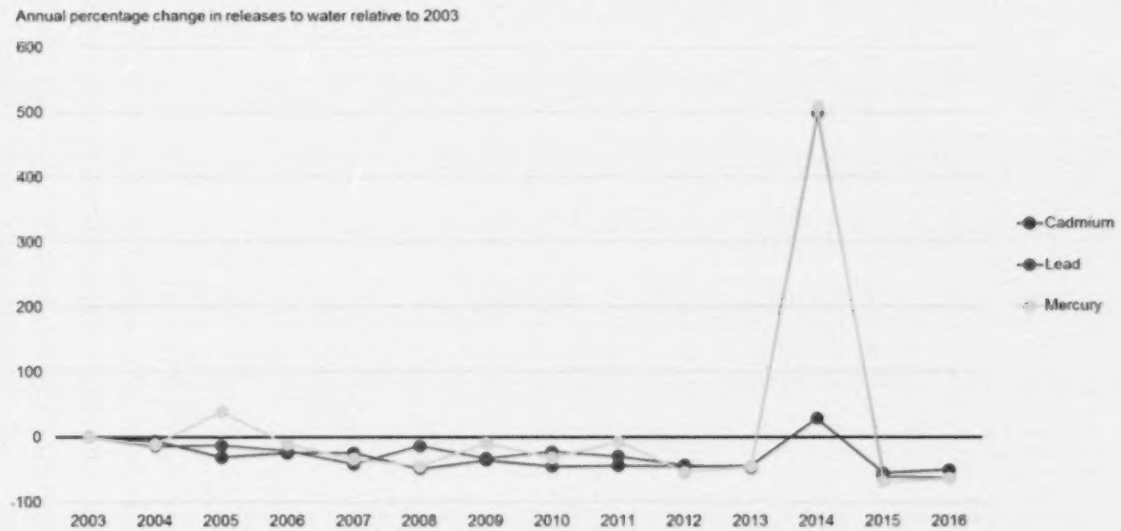
Releases of harmful substances to water

The release of some substances to the environment can harm human health, wildlife and biological diversity. Toxic metals released to water can enter the food web and accumulate in the tissues of living organisms. Exposure to these substances, even in small amounts, can be hazardous to both humans and wildlife. These indicators track human-related releases of mercury, lead and cadmium to water.

Key results

- Releases of mercury, lead and cadmium to water were 63%, 62%and 50% lower in 2016 than in 2003
- In 2014, a significant spill[1] accounted for 92%, 92% and 59% of total releases of mercury, lead and cadmium, respectively

Figure 1. Releases of mercury, lead and cadmium to water, Canada, 2003 to 2016



Data for Figure 1

Note: The indicator reports releases from human activities only. This chart accounts only for the releases to water reported in the National Pollutant Release Inventory based on the inventory reporting criteria for releases of mercury, lead and cadmium and their compounds. These amounts should not be interpreted as comprehensive totals of releases to water of these pollutants in Canada.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

Most releases of mercury, lead and cadmium to water come from the sewage treatment and waste management sector (which includes wastewater treatment plants).[2] In 2016, this source accounted for 58%, 45% and 45% of total releases of these substances, respectively. From 2003 to 2016,

[1] On August 4, 2014, a dam securing a tailings pond at the Mount Polley mine in central British Columbia was breached, spilling mining waste into Polley Lake and surrounding waters.

[2] Wastewater treatment plants do not generate mercury, lead or cadmium. Mercury in wastewater is usually from industrial discharges to sewers from metal finishing, steel manufacturing and refineries, and effluent from waste landfills. The source of lead and cadmium is typically industrial discharges to sewers.

releases of mercury, lead and cadmium from this source declined by 73%, 73% and 65%, respectively.

Mercury and its compounds, lead, and inorganic cadmium compounds are listed as toxic[3] under the Canadian Environmental Protection Act, 1999.

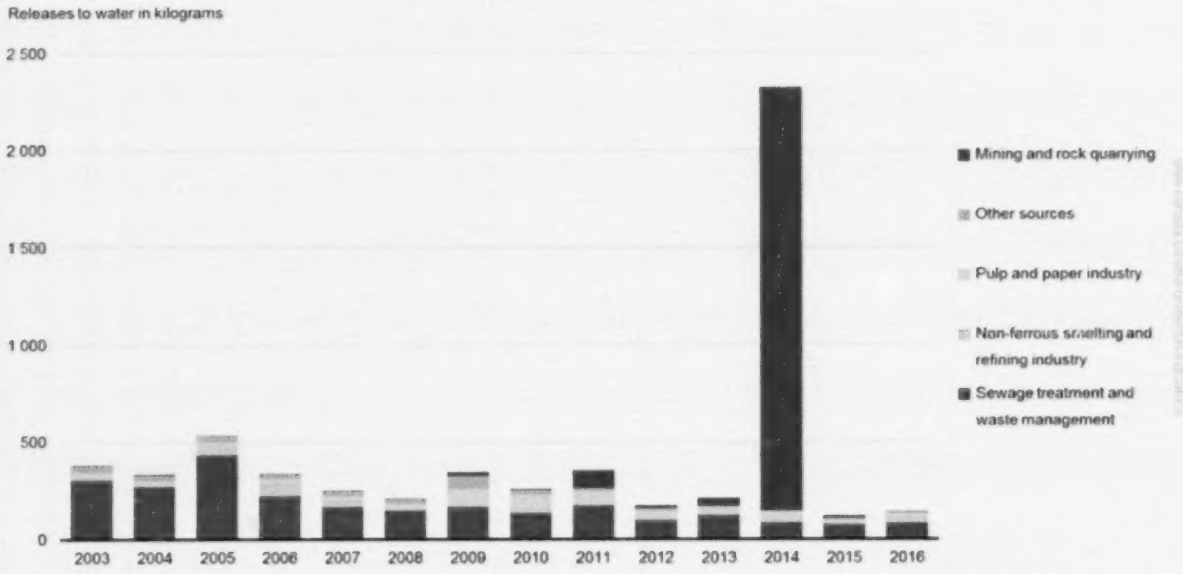
Releases of mercury to water

Mercury is released directly to water from sources such as the pulp and paper industry, mining operations, metal processing and wastewater treatment plants. Releases of mercury can also occur when a product containing mercury is manufactured, used, recycled and disposed of.[4]

Key results

- Since 2003, mercury releases to water have declined by 63% or 239 kilograms (kg)
- In 2016, national releases totalled 142 kg
    - the largest source was the sewage treatment and waste management sector, which represented 58% (83 kg) of the total
- In 2014, a significant spill[5] generated 92% (2 143 kg) of the 2 321 kg of mercury released

Figure 2. Mercury releases to water by source, Canada, 2003 to 2016



Data for Figure 2

[3] Section 64 of the Canadian Environmental Protection Act, 1999 defines a substance as toxic if it is "entering or may enter the environment in a quantity or concentration or under conditions that (a) have or may have an immediate or long-term harmful effect on the environment or its biological diversity; (b) constitute or may constitute a danger to the environment on which life depends; or (c) constitute or may constitute a danger in Canada to human life or health."

[4] The Products Containing Mercury Regulations, which prohibit the manufacture and import of mercury or any of its compounds, with some exemptions for essential products that have no technically or economically viable alternatives (such as certain medical and research applications and dental amalgam), came into force in November 2015.

[5] On August 4, 2014, a dam securing a tailings pond at the Mount Polley mine in central British Columbia was breached, spilling mining waste into Polley Lake and surrounding waters.

Note: The indicator reports releases from human activities only. The indicator includes the amount of elemental mercury and mercury in any compound, alloy or mixture reported in the National Pollutant Release Inventory based on the inventory reporting criteria. As a result, the reported mercury releases to water account for only a portion of the releases of this toxic pollutant to water in Canada. Other sources include electric utilities, manufacturing (except pulp and paper), the oil and gas industry, ore and mineral industries (except non-ferrous smelting and refining) and other miscellaneous sources. For more details on sources, please consult the Data sources and methods.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

In 2016, 3 sectors contributed 95% (135 kg) of total national releases of mercury to water: sewage treatment and waste management, the non-ferrous smelting and refining industry, and the pulp and paper industry.

The largest reduction in mercury releases to water between 2003 and 2016 was in the sewage treatment and waste management sector,[6] with a reduction of 224 kg (73%). This decline contributed to 93% of the total decline in mercury releases to water.

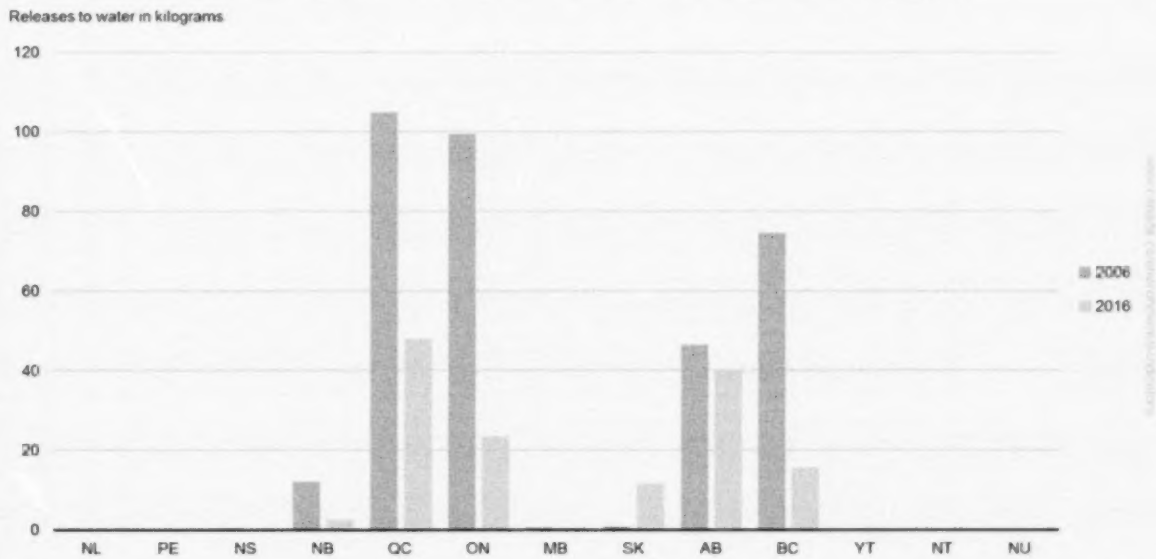
Mercury has significant negative effects on human health and the environment. It persists and bioaccumulates in ecosystems and biota. Exposure of Canadians to mercury poses a particular risk to populations such as Indigenous people who rely heavily on the consumption of predatory fish, such as freshwater trout or Arctic char, and traditional food items, including marine mammals.

Releases of mercury to water by province and territory

Key results

- In 2016, Quebec and Alberta made up 34% (48 kg) and 28% (40 kg) of national mercury releases to water, respectively
- Between 2006 and 2016, Ontario had the largest reduction in releases
    - releases were reduced by 76 kg (or 76%)

Figure 3. Mercury releases to water by province and territory, Canada, 2006 and 2016



[6] The sewage treatment and waste management sector includes wastewater treatment plants. Wastewater treatment plants do not generate mercury. Mercury in wastewater is usually from industrial discharges to sewers from metal finishing, steel manufacturing and refineries, and effluent from waste landfills.

Data for Figure 3

Note: The indicator reports releases from human activities only. The indicator includes the amount of elemental mercury and mercury in any compound, alloy or mixture reported in the National Pollutant Release Inventory based on the inventory reporting criteria. As a result, the reported mercury releases to water represent only a portion of the releases of this toxic pollutant to water in Canada.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

Mercury releases to water were highest in Quebec in 2016, accounting for 34% (48 kg) of the national total. These releases mostly came from a non-ferrous smelting and refining facility.

Ontario had the largest decline in mercury releases between 2006 and 2016. This decline was mostly due to reductions in the sewage treatment and waste management sector. Saskatchewan had the largest increase in releases over this period. This increase was the result of a single wastewater treatment plant.

In 2016, the sewage treatment and waste management sector was the main source of releases of mercury to water in Alberta, Ontario, Saskatchewan, British Columbia, Manitoba and Nova Scotia. The pulp and paper industry was the largest source in New Brunswick. In Quebec, the non-ferrous smelting and refining industry was the main source of releases of mercury to water. In the Northwest Territories and Newfoundland and Labrador, the largest source was mining and rock quarrying.

In 2006, there were no reported mercury releases to water in Newfoundland and Labrador, Prince Edward Island, Yukon, the Northwest Territories and Nunavut. In 2016, Prince Edward Island, Yukon and Nunavut had no reported releases.

Releases of mercury to water from facilities

The National Pollutant Release Inventory provides detailed information on emissions and releases from industrial and commercial facilities that meet its reporting criteria.

The Environmental Indicators provide access to this information through an online interactive map. With this map, you can focus on local areas and get details on releases of mercury to water from individual facilities.

Figure 4. Releases of mercury to water by facility, Canada, 2016

Source: Environment and Climate Change Canada (2017) National Pollutant Release Inventory Data Search - 2016 Facility Reported Data.

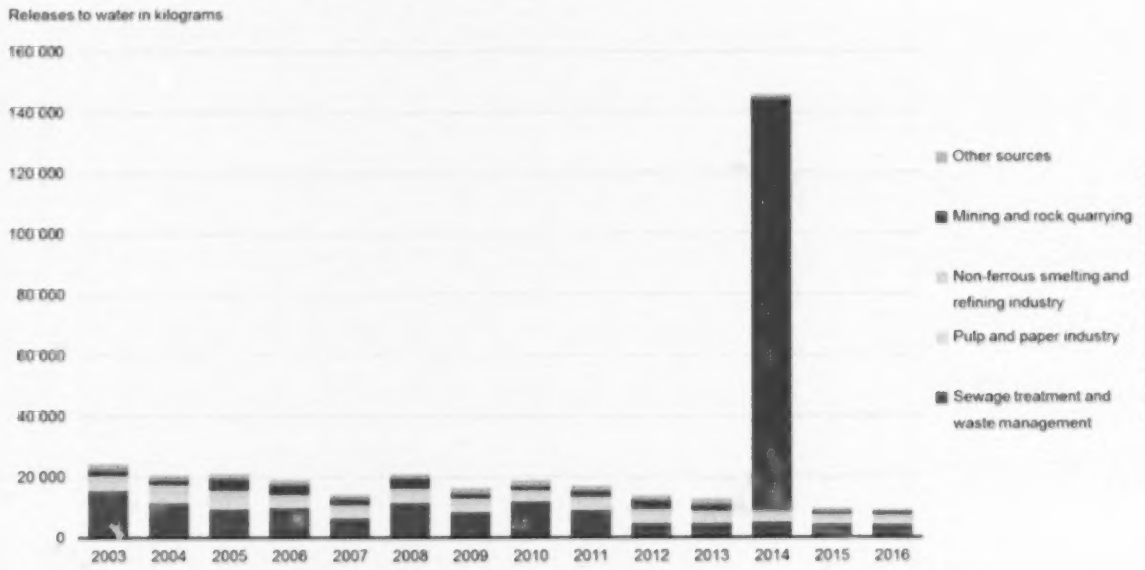
Releases of lead to water

Lead is released directly to water from sources such as the pulp and paper industry, metal processing, mining and rock quarrying and wastewater treatment plants. It is also released by natural processes such as rock and soil erosion. Lead can be deposited on land or water surfaces and then build up in soils or sediments.

Key results

- Since 2003, lead releases to water have decreased by 62% or 15 131 kilograms (kg)
- In 2016, national releases totalled 9 208 kg
    - the largest source was the sewage treatment and waste management sector, representing 45% (4 169 kg) of the total
- In 2014, a significant spill generated 92% (134 238 kg) of the 145 712 kg of lead released[7]

Figure 5. Lead releases to water by source, Canada, 2003 to 2016



Date for Figure 5

Note: The indicator reports releases from human activities only. The indicator includes the amount of elemental lead and lead in any compound, alloy or mixture reported in the National Pollutant Release Inventory based on the inventory reporting criteria. As a result, the reported lead releases to water account for only a portion of the releases of this toxic pollutant to water in Canada. Other sources include electric utilities, manufacturing (except pulp and paper), the oil and gas industry, ore and mineral industries (except non-ferrous smelting and refining) and other miscellaneous sources. For more details on sources, please consult the Data sources and methods.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

In 2016, about 80% (7 307 kg) of national releases of lead to water came from sewage treatment and waste management, the pulp and paper industry, and the non-ferrous smelting and refining industry.

[7] On August 4, 2014, a dam securing a tailings pond at the Mount Polley mine in central British Columbia was breached, spilling mining waste into Polley Lake and surrounding waters.

The sewage treatment and waste management sector[8] contributed to a 75% (11 318 kg) reduction in lead releases to water since 2003. The mining and rock quarrying and pulp and paper industries contributed a further 7% (1 068 kg) and 6% (969 kg), respectively to the decrease in releases.

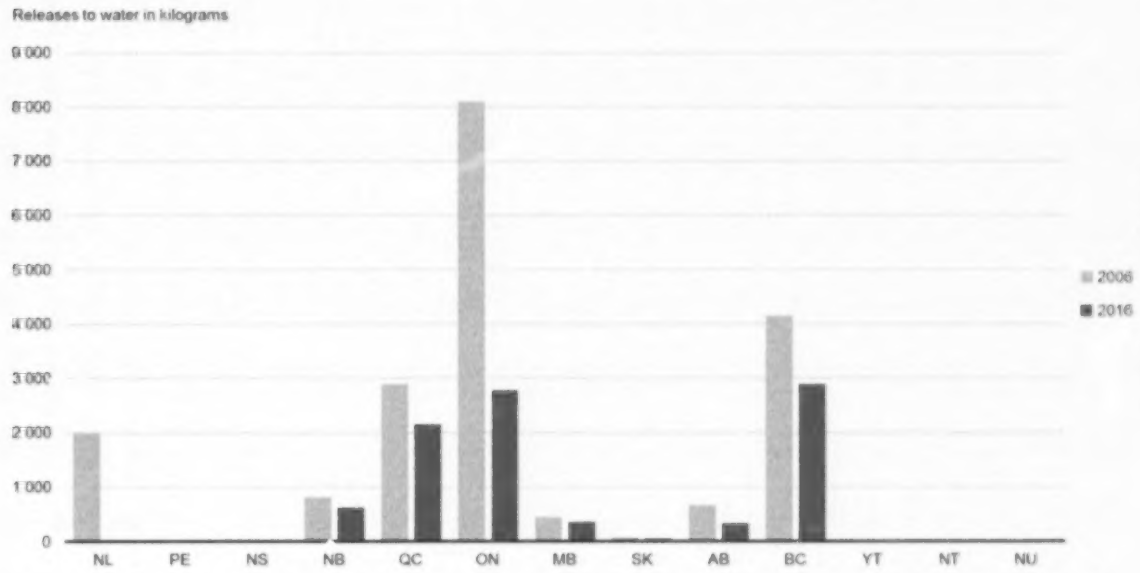
Exposure to lead, even in small amounts, can be hazardous to both humans and wildlife.

Releases of lead to water by province and territory

Key results

- In 2016, British Columbia, Ontario and Quebec made up 85% (7 816 kg) of national lead releases to water
- Between 2006 and 2016, Ontario had the largest decrease of releases
    - releases within the province decreased by 5 316 kg (or 66%)

Figure 6. Lead releases to water by province and territory, Canada, 2006 and 2016



Data for Figure 6

Note: The indicator reports releases from human activities only. The indicator includes the amount of elemental lead and lead in any compound, alloy or mixture reported in the National Pollutant Release Inventory based on the inventory reporting criteria. As a result, the reported lead releases to water represent only a portion of the releases of this toxic pollutant to water in Canada.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

Lead releases to water were highest in British Columbia in 2016, accounting for 31% (2 888 kg) of the national total. A non-ferrous smelting and refining facility was the main source of these releases.

Ontario had the largest decline in lead releases between 2006 and 2016. This decline was mostly due to reductions in the sewage treatment and waste management sector.

[8] The sewage treatment and waste management sector includes wastewater treatment plants. Wastewater treatment plants do not generate lead. The source of lead in wastewater treatment plant effluent is typically industrial discharges to sewers.

In 2016, the sewage treatment and waste management sector was the main source of lead releases to water in Ontario, Quebec, Alberta, Saskatchewan, Nova Scotia and Prince Edward Island. In British Columbia, the largest source was the non-ferrous smelting and refining industry. Mining and rock quarrying was the largest source in New Brunswick, Manitoba, Newfoundland and Labrador, Nunavut and the Northwest Territories.

In 2006, there were no reported releases of lead in Prince Edward Island, Yukon and the Northwest Territories. There were no releases reported in Yukon in 2016.

Releases of lead to water from facilities

The National Pollutant Release Inventory provides detailed information on emissions and releases from industrial and commercial facilities that meet its reporting criteria.

The Environmental Indicators provide access to this information through an online interactive map. With this map, you can focus on local areas and get details on releases of lead to water from individual facilities.

Figure 7. Releases of lead to water by facility, Canada, 2016

Source: Environment and Climate Change Canada (2017) National Pollutant Release Inventory Data Search - 2016 Facility Reported Data.

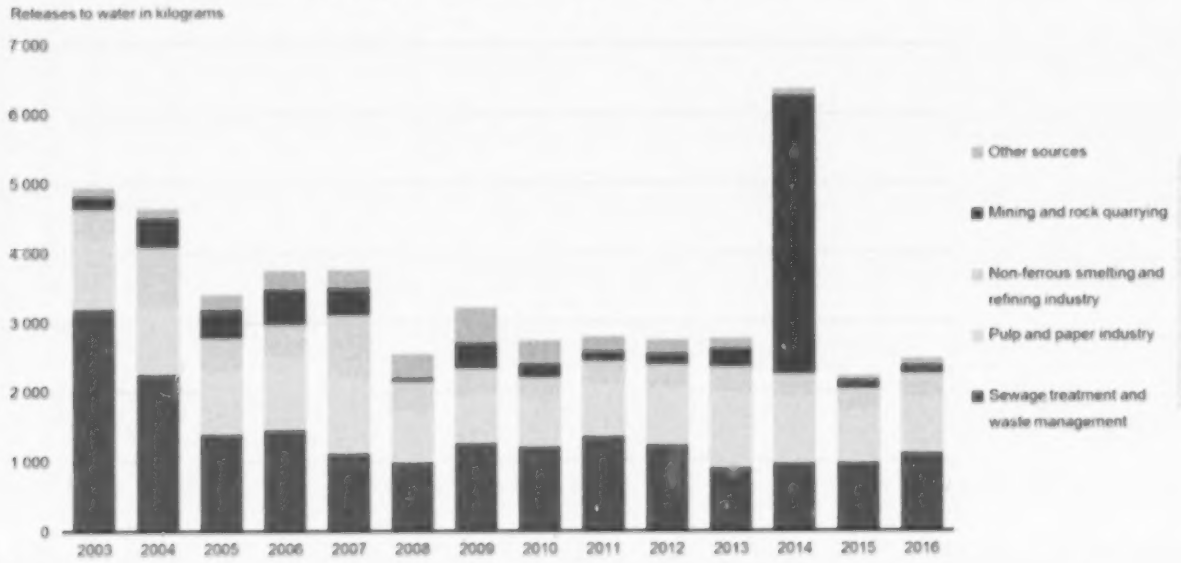
Releases of cadmium to water

Cadmium can be released directly to water from human activities such as non-ferrous smelting and refining, and fuel consumption for electricity or heating. Cadmium is a naturally occurring metal. It is used in batteries and in electroplating to protect other metals from corrosion.

Key results

- Since 2003, cadmium releases to water have declined by 50% or 2 472 kilograms (kg)
- In 2016, national releases totalled 2 473 kg
    - the largest source was the sewage treatment and waste management sector, representing about 45% (or 1 118 kg) of national releases
- In 2014, a significant spill generated 59% (3 768 kg) of the 6 358 kg of cadmium released[9]

Figure 8. Cadmium releases to water by source, Canada, 2003 to 2016



Data for Figure 8

Note: The indicator reports releases from human activities only. The indicator includes the amount of elemental cadmium and cadmium in any compound, alloy or mixture reported in the National Pollutant Release Inventory based on the inventory reporting criteria. As a result, the reported cadmium releases to water account for only a portion of the releases of this toxic pollutant to water in Canada. Other sources include electric utilities, manufacturing (except pulp and paper), the oil and gas industry, ore and mineral industries (except non-ferrous smelting and refining) and other miscellaneous sources. For more details on sources, please consult the Data sources and methods.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

In 2016, 91% (2 259 kg) of cadmium released to water came from sewage treatment and waste management, the pulp and paper industry, and the non-ferrous smelting and refining industry.

The sewage treatment and waste management sector[10] contributed to an 84% (2 077 kg) reduction in cadmium releases to water since 2003. The pulp and paper and non-ferrous smelting and refining

[9] On August 4, 2014, a dam securing a tailings pond at the Mount Polley mine in central British Columbia was breached, spilling mining waste into Polley Lake and surrounding waters.

industries contributed an additional 7% (185 kg) and 5% (112 kg), respectively to the total decrease in cadmium.

Between 2003 and 2016, the largest reduction in releases of cadmium to water was the sewage treatment and waste management sector, with a reduction of 65% (2 077 kg).

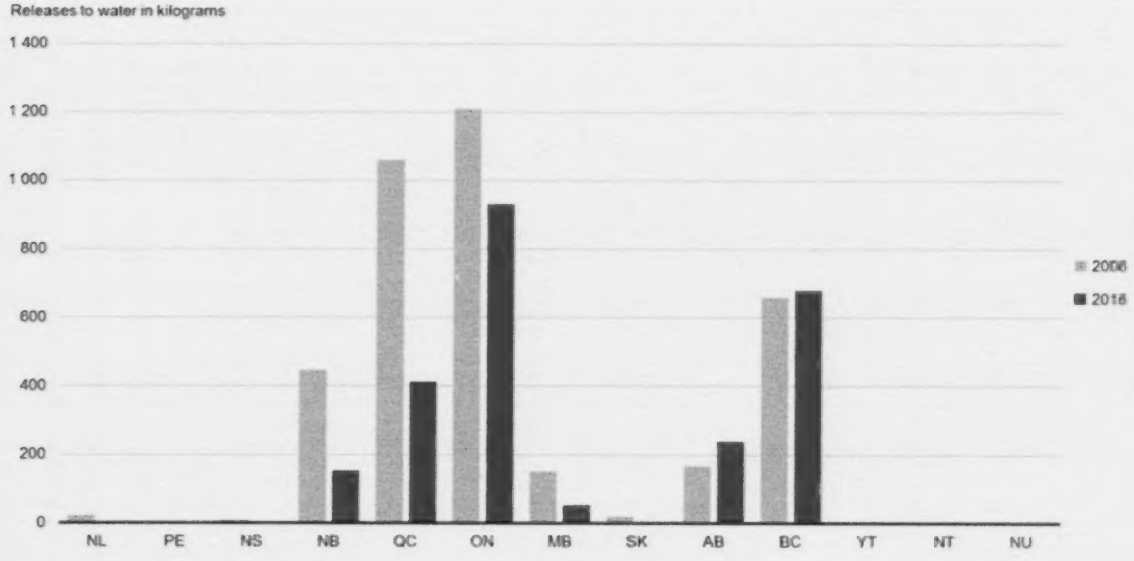
Exposure to cadmium, which builds up in humans and wildlife, can be hazardous to both.

Releases of cadmium to water by province and territory

Key results

- In 2016, Ontario had the largest releases of cadmium to water, accounting for 38% (931 kg) of the national total
- Between 2006 and 2016, Quebec had the largest decline in releases
  - releases declined by 648 kg (or 61%)

Figure 9. Cadmium releases to water by province and territory, Canada, 2006 and 2016



Data for Figure 9

Note: The indicator reports releases from human activities only. The indicator includes the amount of elemental cadmium and cadmium in any compound, alloy or mixture reported in the National Pollutant Release Inventory based on the inventory reporting criteria. As a result, the reported cadmium releases to water represent only a portion of the releases of this toxic pollutant to water in Canada.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

Cadmium releases to water were highest in Ontario in 2016, accounting for 38% (931 kg) of the national total. The sewage treatment and waste management sector was the main source of these releases.

[10] The sewage treatment and waste management sector includes wastewater treatment plants. Wastewater treatment plants do not generate cadmium. The source of cadmium in wastewater treatment plant effluent is typically industrial discharges to sewers.

Between 2006 and 2016, Quebec had the largest decrease in cadmium releases. This decrease was mostly due to reductions in the sewage treatment and waste management sector. Alberta had the largest increase in releases over this period. The increase resulted from larger releases by sewage treatment and waste management sector.

In 2016, the sewage treatment and waste management sector was the main source of releases of cadmium in Ontario, Alberta, Nova Scotia, Prince Edward Island and Saskatchewan. The pulp and paper industry was the largest source in British Columbia, Quebec and New Brunswick, while mining and rock quarrying was the largest source in Manitoba, Newfoundland and Labrador, Northwest Territories and Nunavut.

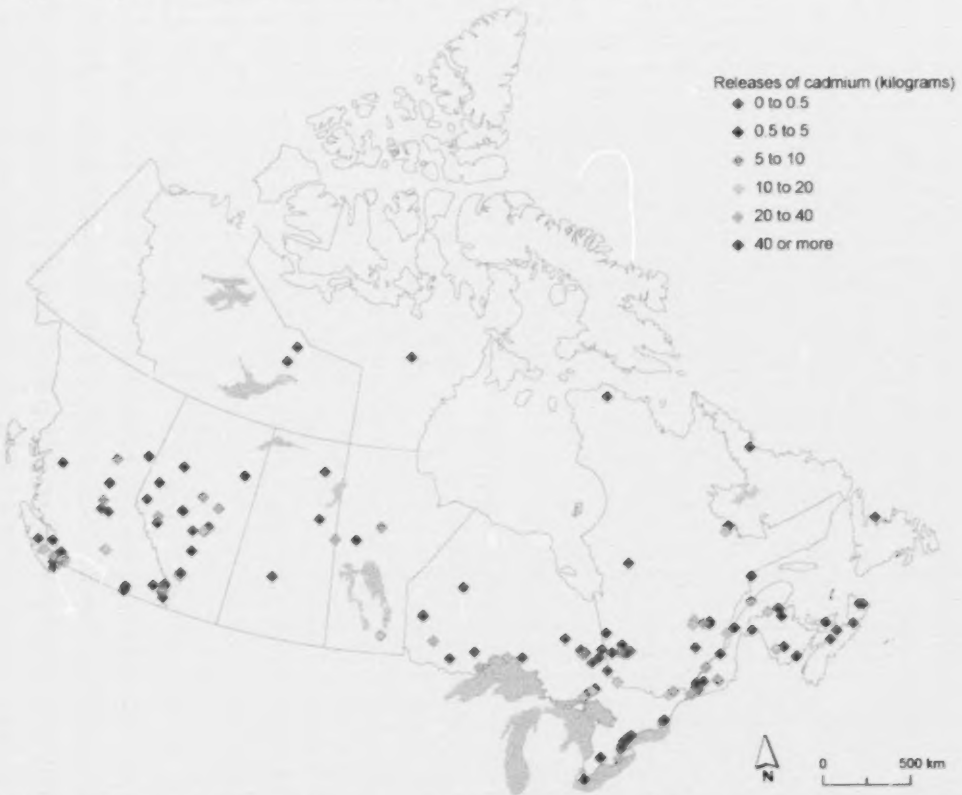
In 2006, there were no reported releases of cadmium in Prince Edward Island, Yukon, the Northwest Territories or Nunavut. There were no releases reported in Yukon in 2016.

Releases of cadmium to water from facilities

The National Pollutant Release Inventory provides detailed information on emissions and releases from industrial and commercial facilities that meet its reporting criteria.

The Environmental Indicators provide access to this information through an online interactive map. With this map, you can focus on local areas and get details on releases of cadmium to water from individual facilities.

Figure 10. Releases of cadmium to water by facility, Canada, 2016



Source: Environment and Climate Change Canada (2017) National Pollutant Release Inventory Data Search - 2016 Facility Reported Data.

About the indicators

What the indicators measure

These indicators track human-related releases to water of 3 substances that are defined as toxic under the Canadian Environmental Protection Act, 1999: mercury, lead and cadmium and their compounds. For each toxic substance, data are provided at the national, regional (provincial and territorial) and facility level and by source.

Why these indicators are important

Mercury and its compounds, lead and inorganic cadmium compounds are on the Toxic Substances List under Schedule 1 of the Canadian Environmental Protection Act, 1999. This means that these substances are "entering or may enter the environment in a quantity or concentration or under conditions that (a) have or may have an immediate or long-term harmful effect on the environment or its biological diversity; (b) constitute or may constitute a danger to the environment on which life depends; or (c) constitute or may constitute a danger in Canada to human life or health."

The indicators inform Canadians about releases to water of these 3 substances from human activity in Canada. These indicators also help the government to identify priorities and develop or revise strategies to inform further risk management and to track progress on policies put in place to reduce or control these 3 substances and water pollution in general.

Related indicators

The Emissions of harmful substances to air indicators track human-related emissions to air of 3 toxic substances, namely mercury, lead and cadmium, and their compounds. For each toxic substance, data are provided at the national and regional (provincial and territorial) level and by source. Facility and global emissions to air are also provided for mercury.

The Human exposure to harmful substances indicators track the concentrations of 4 substances (mercury, lead, cadmium and bisphenol A) in the Canadian population.

Safe and healthy communities

These indicators support the measurement of progress towards the following 2016–2019 Federal Sustainable Development Strategy long-term goal: All Canadians live in clean, sustainable communities that contribute to their health and well-being.

Data sources and methods

Data sources

Data for the indicators and the interactive maps are taken from the normalized dataset of the National Pollutant Release Inventory (the inventory). These indicators include the amount of elemental mercury, lead and cadmium in any compound, alloy or mixture released to water as reported to the inventory based on its reporting criteria.

More information

The inventory is compiled by Environment and Climate Change Canada (the department), and includes releases reported by industrial, commercial and institutional facilities. It is Canada's legislated, publicly accessible inventory of pollutant releases (to air, water and land), disposals and transfers for recycling. It consists of information reported by facilities to the department under the Canadian Environmental Protection Act, 1999 (the act). Under the

act, owners or operators of facilities that manufacture, process or otherwise use or release one or more of the substances tracked by the inventory and that meet reporting thresholds and other requirements must report their pollutant releases annually.

Estimation of releases to water

Releases to water are estimated or measured through one of the following methods:

- continuous emission monitoring systems
- predictive emission monitoring
- source testing
- mass balance
- site-specific emission factors
- published emission factors
- engineering estimates

These measurement methods and estimation techniques are used by the facilities to report their releases (point sources) to the inventory. The Report to the National Pollutant Release Inventory program web page provides information to owners or operators of facilities required to report to the inventory, as well as details on the program's calculation methods.

Data completeness

Because the indicators are derived solely from the inventory's database, they reflect only releases from facilities that met the reporting criteria. As a result, the indicators do not include all releases in Canada, they are limited to the main point sources for each selected toxic substance.

Data timeliness

The data are current up to 2016. The indicators are reported approximately 1.5 years after data collection because of the time required for data validation, analysis and interpretation.

Methods

The indicators are produced by grouping data from the inventory to report on the key sources that contribute to the majority of mercury, lead and cadmium releases to water.

More information

Indicator coverage

Historical data are provided at the national level and by source for the period from 2003 to 2016. The year 2003 was selected as the first year for releases to water because it was the year the inventory updated its reporting criteria for mercury, lead and cadmium. For the regional (provincial/territorial) indicators releases to water are provided for 2006 and 2016. Releases of mercury, lead and cadmium to water by facility are displayed on the Environmental Indicators interactive maps.

Sources classification

Source descriptions for the indicators were taken from Statistics Canada's North American Industry Classification System. The 4-digit code of the classification system, as reported by the facilities, was used for source classification for the data reported by the inventory. These sources were then classified into the following sources for reporting in the indicators:

- electric utilities
- sewage treatment and waste management
- manufacturing (except pulp and paper)
- mining and rock quarrying
- miscellaneous

- non-ferrous smelting and refining industry
- oil and gas industry
- ore and mineral industries (except non-ferrous smelting and refining)
- pulp and paper industry

Table 1 shows the allocation of sources of harmful substances reported in the indicators compared with those reported by the inventory.

Table 1. Alignment of sources reported in the Canadian Environmental Sustainability Indicators and the National Pollutant Release Inventory

Sources in the Canadian Environmental Sustainability Indicators	Sources in the National Pollutant Release Inventory (based on the North American Industry Classification System)
Electric utilities	Electric power generation, transmission and distribution
Sewage treatment and waste management	Water, sewage and other systems
Sewage treatment and waste management	Waste collection
Sewage treatment and waste management	Waste treatment and disposal
Sewage treatment and waste management	Remediation and other waste management services
Manufacturing (except pulp and paper)	Forest nurseries and gathering of forest products
Manufacturing (except pulp and paper)	Sawmills and wood preservation
Manufacturing (except pulp and paper)	Veneer, plywood and engineered wood product manufacturing
Manufacturing (except pulp and paper)	Petroleum and coal product manufacturing
Manufacturing (except pulp and paper)	Basic chemical manufacturing
Manufacturing (except pulp and paper)	Pesticide, fertilizer and other agricultural chemical manufacturing
Manufacturing (except pulp and paper)	Pharmaceutical and medicine manufacturing
Manufacturing (except pulp and paper)	Other chemical product manufacturing
Manufacturing (except pulp and paper)	Rubber product manufacturing
Manufacturing (except pulp and paper)	Glass and glass product manufacturing
Manufacturing (except pulp and paper)	Cement and concrete product manufacturing
Manufacturing (except pulp and paper)	Forging and stamping
Manufacturing (except pulp and paper)	Spring and wire product manufacturing
Manufacturing (except pulp and paper)	Coating, engraving, cold and heat treating and allied activities
Manufacturing (except pulp and paper)	Other fabricated metal product manufacturing
Manufacturing (except pulp and paper)	Engine, turbine and power transmission equipment manufacturing
Manufacturing (except pulp and paper)	Semiconductor and other electronic component manufacturing

Sources in the Canadian Environmental Sustainability Indicators	Sources in the National Pollutant Release Inventory (based on the North American Industry Classification System)
Manufacturing (except pulp and paper)	Electrical equipment manufacturing
Manufacturing (except pulp and paper)	Other electrical equipment and component manufacturing
Manufacturing (except pulp and paper)	Motor vehicle parts manufacturing
Manufacturing (except pulp and paper)	Aerospace product and parts manufacturing
Manufacturing (except pulp and paper)	Other miscellaneous manufacturing
Mining and rock quarrying	Coal mining
Mining and rock quarrying	Metal ore mining
Mining and rock quarrying	Non-metallic mineral mining and quarrying
Miscellaneous	Support activities for water transportation
Miscellaneous	Other professional, scientific and technical services
Miscellaneous	General medical and surgical hospitals
Non-ferrous smelting and refining industry	Non-ferrous metal (except aluminum) production and processing
Oil and gas industry	Oil and gas extraction
Ore and mineral industries (except non-ferrous smelting and refining)	Iron and steel mills and ferro-alloy manufacturing
Ore and mineral industries (except non-ferrous smelting and refining)	Steel product manufacturing from purchased steel
Ore and mineral industries (except non-ferrous smelting and refining)	Alumina and aluminum production and processing
Ore and mineral industries (except non-ferrous smelting and refining)	Foundries
Pulp and paper industry	Pulp, paper and paperboard mills

For display purposes, sources with smaller releases are sometimes grouped together under the category "Other sources" in the charts of releases by source. The names of the grouped sources are listed in the notes of each chart.

Recent changes

The regional (provincial/territorial) indicators have been updated to show a comparison between 2006 and 2016.

Caveats and limitations

The indicators reflect only human-related releases to water as reported by facilities to the inventory. They do not include estimates of releases from other sources (such as consumer products) in Canada.

Occasional updates and data quality checking can be done after initial release of the inventory's normalized dataset.

The number and composition of facilities that report releases to water to the inventory vary each year. This variation is due to the fact that only facilities that meet or exceed the reporting threshold are required to report. An analysis of how this might affect the apparent trends has not been undertaken.

Facilities reporting to the inventory may use different methods to calculate releases. These methods vary depending on the substance and/or facility, and may also change from year to year.

Resources

References

Environment and Climate Change Canada (2017) Access data from the National Pollutant Release Inventory. September 14, 2017 version. Retrieved on February 21, 2018.

Related information

Environment and Climate Change Canada (2017) Using and interpreting data from the National Pollutant Release Inventory. Retrieved on February 21, 2018.

Annex

Annex A. Data tables for the figures presented in this document

Table A.1. Data for Figure 1. Releases of mercury, lead and cadmium to water, Canada, 2003 to 2016

Year	Cadmium (annual percentage change in releases to water relative to 2003)	Mercury (annual percentage change in releases to water relative to 2003)	Lead (annual percentage change in releases to water relative to 2003)
2003	0	0	0
2004	-6	-11	-14
2005	-31	40	-13
2006	-24	-11	-21
2007	-24	-33	-41
2008	-49	-44	-14
2009	-35	-10	-32
2010	-45	-32	-22
2011	-44	-7	-29
2012	-45	-54	-43
2013	-44	-45	-47
2014	29	508	499
2015	-55	-68	-61
2016	-50	-63	-62

Note: The indicator reports releases from human activities only. This table accounts only for the releases to water reported in the National Pollutant Release Inventory based on the inventory reporting criteria for releases of mercury, lead and cadmium and their compounds. These amounts should not be interpreted as comprehensive totals of releases to water of these pollutants in Canada.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

Table A.2. Data for Figure 2. Mercury releases to water by source, Canada, 2003 to 2016

Year	Sewage treatment and waste management (releases to water in kilograms)	Non-ferrous smelting and refining industry (releases to water in kilograms)	Pulp and paper industry (releases to water in kilograms)	Other sources (releases to water in kilograms)	Mining and rock quarrying (releases to water in kilograms)	Total (releases to water in kilograms)
2003	306.8	14.1	24.1	35.2	1.5	381.6
2004	272.7	13.3	17.5	26.1	8.2	337.8
2005	435.2	53.4	14.0	29.1	1.0	532.6
2006	226.9	61.6	26.3	20.8	3.5	339.1
2007	169.4	31.2	25.6	24.0	4.1	254.3
2008	149.7	10.7	22.8	25.3	3.9	212.4
2009	167.6	9.4	83.6	66.5	17.9	345.1
2010	137.9	23.4	71.0	21.9	6.4	260.5

Year	Sewage treatment and waste management (releases to water in kilograms)	Non-ferrous smelting and refining industry (releases to water in kilograms)	Pulp and paper industry (releases to water in kilograms)	Other sources (releases to water in kilograms)	Mining and rock quarrying (releases to water in kilograms)	Total (releases to water in kilograms)
2011	173.6	9.3	68.2	13.2	90.2	354.5
2012	100.3	5.9	43.9	9.1	17.0	176.0
2013	123.6	8.5	34.6	6.2	38.6	211.5
2014	87.4	10.4	47.8	1.4	2 174.4	2 321.4
2015	77.9	5.5	21.7	1.6	14.5	121.2
2016	83.3	30.7	21.0	4.1	3.4	142.5

Note: Totals may not add up due to rounding. The indicator reports releases from human activities only. The indicator includes the amount of elemental mercury and mercury in any compound, alloy or mixture reported in the National Pollutant Release Inventory based on the inventory reporting criteria. As a result, the reported mercury releases to water account for only a portion of the releases of this toxic pollutant to water in Canada. Other sources include electric utilities, manufacturing (except pulp and paper), the oil and gas industry, ore and mineral industries (except non-ferrous smelting and refining) and other miscellaneous sources. For more details on sources, please consult the Data sources and methods.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

Table A.3. Data for Figure 3. Mercury releases to water by province and territory, Canada, 2006 and 2016

Province or territory	2006 (releases to water in kilograms)	2016 (releases to water in kilograms)
Newfoundland and Labrador	0	< 0.1
Prince Edward Island	0	0
Nova Scotia	0.4	0.2
New Brunswick	12.2	2.5
Quebec	104.9	48.0
Ontario	99.4	23.5
Manitoba	0.5	0.6
Saskatchewan	0.8	11.7
Alberta	46.4	39.9
British Columbia	74.5	15.6
Yukon	0	0
Northwest Territories	0	0.3
Nunavut	0	0
Canada	339.1	142.5

Note: A "0" value indicates that the province or territory has no reported releases. Totals may not add up due to rounding. The indicator reports releases from human activities only. The indicator includes the amount of elemental mercury and mercury in any compound, alloy or mixture reported in the National Pollutant Release Inventory based on the inventory reporting criteria. As a result, the reported mercury releases to water represent only a portion of the releases of this toxic pollutant to water in Canada.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

Table A.4. Data for Figure 5. Lead releases to water by source, Canada, 2003 to 2016

Year	Sewage treatment and waste management (releases to water in kilograms)	Pulp and paper industry (releases to water in kilograms)	Non-ferrous smelting and refining industry (releases to water in kilograms)	Mining and rock quarrying (releases to water in kilograms)	Other sources (releases to water in kilograms)	Total (releases to water in kilograms)
2003	15 487.1	2 583.0	2 253.9	2 112.9	1 901.8	24 338.7
2004	11 526.4	2 886.4	2 881.5	1 925.5	1 631.8	20 851.7
2005	9 472.5	3 340.5	2 778.4	3 713.5	1 964.5	21 269.4
2006	9 899.8	2 365.9	1 874.6	3 429.6	1 569.5	19 139.3
2007	6 417.4	2 370.8	1 819.4	2 252.4	1 396.1	14 256.2
2008	11 582.8	2 424.6	2 194.1	3 274.9	1 493.6	20 970.0
2009	8 489.7	2 252.7	2 148.8	1 614.3	1 957.8	16 463.3
2010	11 973.3	2 117.4	1 526.6	1 343.4	1 938.8	18 899.6
2011	8 974.8	2 908.8	1 518.9	1 876.0	1 886.3	17 164.9
2012	4 686.7	2 800.8	1 773.6	3 074.4	1 642.4	13 977.9
2013	4 660.3	2 423.3	1 483.6	2 388.7	1 905.9	12 861.9
2014	5 114.7	1 849.4	1 768.1	135 562.2	1 417.6	145 712.0
2015	4 395.9	1 637.9	1 336.7	996.7	1 236.7	9 603.9
2016	4 169.2	1 613.6	1 524.2	1 045.4	855.2	9 207.6

Note: Totals may not add up due to rounding. The indicator reports releases from human activities only. The indicator includes the amount of elemental lead and lead in any compound, alloy or mixture reported in the National Pollutant Release Inventory based on the inventory reporting criteria. As a result, the reported lead releases to water account for only a portion of the releases of this toxic pollutant to water in Canada. Other sources include electric utilities, manufacturing (except pulp and paper), the oil and gas industry, ore and mineral industries (except non-ferrous smelting and refining) and other miscellaneous sources. For more details on sources, please consult the Data sources and methods.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

Table A.5. Data for Error! Reference source not found.

Province or territory	2006 (releases to water in kilograms)	2016 (releases to water in kilograms)
Newfoundland and Labrador	2 000.6	15.1
Prince Edward Island	0	5.8
Nova Scotia	7.3	8.0
New Brunswick	811.6	623.5
Quebec	2 891.8	2 146.5
Ontario	8 096.8	2 780.9
Manitoba	446.9	355.3
Saskatchewan	67.8	49.7
Alberta	669.3	333.6
British Columbia	4 147.1	2 888.2
Yukon	0	0
Northwest Territories	0	0.3

Province or territory	2006 (releases to water in kilograms)	2016 (releases to water in kilograms)
Nunavut	0.1	0.8
Canada	19 139.3	9 207.6

Note: A "0" value indicates that the province or territory has no reported releases. Totals may not add up due to rounding. The indicator reports releases from human activities only. The indicator includes the amount of elemental lead and lead in any compound, alloy or mixture reported in the National Pollutant Release Inventory based on the inventory reporting criteria. As a result, the reported lead releases to water represent only a portion of the releases of this toxic pollutant to water in Canada.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

Table A.6. Data for Figure 8. Cadmium releases to water by source, Canada, 2003 to 2016

Year	Sewage treatment and waste management (releases to water in kilograms)	Pulp and paper industry (releases to water in kilograms)	Non-ferrous smelting and refining industry (releases to water in kilograms)	Mining and rock quarrying (releases to water in kilograms)	Other sources (releases to water in kilograms)	Total (releases to water in kilograms)
2003	3 195.1	1 012.2	426.4	181.2	129.7	4 944.6
2004	2 258.8	957.7	867.8	423.8	136.5	4 644.6
2005	1 391.2	931.6	454.0	402.1	229.4	3 408.3
2006	1 452.3	1 076.4	435.3	514.9	267.6	3 746.5
2007	1 115.0	1 104.2	877.7	396.6	264.2	3 757.7
2008	979.1	766.1	394.8	54.2	348.1	2 542.2
2009	1 262.0	710.4	365.4	369.1	509.7	3 216.6
2010	1 212.8	704.5	289.0	189.0	345.6	2 741.0
2011	1 356.3	766.3	321.5	134.5	212.9	2 791.5
2012	1 233.2	823.7	327.0	158.9	200.9	2 743.6
2013	902.2	1 095.6	352.2	268.0	145.9	2 763.8
2014	968.0	960.0	319.5	4 002.8	107.9	6 358.3
2015	976.7	770.0	287.3	114.7	83.8	2 232.5
2016	1 117.9	827.2	314.1	110.5	103.3	2 473.0

Note: Totals may not add up due to rounding. The indicator reports releases from human activities only. The indicator includes the amount of elemental cadmium and cadmium in any compound, alloy or mixture reported in the National Pollutant Release Inventory based on the inventory reporting criteria. As a result, the reported cadmium releases to water account for only a portion of the releases of this toxic pollutant to water in Canada. Other sources include electric utilities, manufacturing (except pulp and paper), the oil and gas industry, ore and mineral industries (except non-ferrous smelting and refining) and other miscellaneous sources. For more details on sources, please consult the Data sources and methods.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

Table A.7. Data for Figure 9. Cadmium releases to water by province and territory, Canada, 2006 and 2016

Province or territory	2006 (releases to water in kilograms)	2016 (releases to water in kilograms)
Newfoundland and Labrador	22.6	0.8
Prince Edward Island	0	1.5
Nova Scotia	9.2	4.2
New Brunswick	446.5	153.2
Quebec	1 059.7	412.0
Ontario	1 209.0	931.4
Manitoba	152.3	52.3
Saskatchewan	19.8	0.5
Alberta	168.1	237.4
British Columbia	659.3	679.5
Yukon	0	0
Northwest Territories	0	0.1
Nunavut	0	< 0.1
Canada	3 746.5	2 473.0

Note: A "0" value indicates that the province or territory has no reported releases. Totals may not add up due to rounding. The indicator reports releases from human activities only. The indicator includes the amount of elemental cadmium and cadmium in any compound, alloy or mixture reported in the National Pollutant Release Inventory based on the inventory reporting criteria. As a result, the reported cadmium releases to water represent only a portion of the releases of this toxic pollutant to water in Canada.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

Additional information can be obtained at:

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